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10/712,181	11/13/2003	Jiebo Luo	87279DMW	7890

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Pamela R. Crocker
Patent Legal Staff
Eastman Kodak Company
343 State Street
Rochester, NY 14650-2201

EXAMINER	
KRASNIC, BERNARD	

ART UNIT	PAPER NUMBER
2624	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/712,181	LUO ET AL.	
	Examiner	Art Unit	
	Bernard Krasnic	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 October 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,8 and 10-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,8 and 10-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. The Request for Continued Examination filed 10/15/2007 have been entered and made of record.

2. The Applicant has canceled claim(s) 7 and 9.

3. The Applicant has included newly added claim(s) 12.

4. The application has pending claim(s) 1-6, 8, and 10-12.

5. Applicant's arguments with respect to claim(s) 1-6, 8, and 10-12 have been considered but are moot in view of the new ground(s) of rejection because of the Request for Continued Examination (RCE).

6. Applicant's arguments filed 10/15/2007 have been fully considered but they are not persuasive.

The Applicant alleges, "A notable feature of Claim 1 ..." in page 5, "Applicants respectfully submit that they understand Simpson ..." in page 6, and "For at least these reasons ..." in page 6, and states respectively that the prior art reference Simpson does not teach generating a revised image classification of each image based at least on the respective initial image classification as recited in claim 1 and that "none of the other cited references are cited by the Final Office Action as teaching or suggesting the

above-discussed features of Claim 1". Firstly the Examiner disagrees because this limitation that the revised image classification of each image is based at least on the respective initial image classification as recited in the amended independent claim 1 was not part of the claim language in the Amendment After Non-Final dated 5/16/2007 and therefore the issue was never raised by the Examiner during the Final Office Action dated 7/13/2007. Secondly the Examiner agrees that Simpson does not specifically disclose that the RNNCCS is based on the results of the FFNN and therefore the revised image / RNNCCS as discussed in the Final Office Action does not depend on the initial image classification / FFNN. However, due to further search and consideration, Simpson in view of Loui ("Automatic image event segmentation and quality screening for Albuming Applications" - IEEE - July 2000, cited by the Applicant in the Information Disclosure Sheet IDS filed on 11/13/2003) does teach the amended limitation as recited in claim 1; refer below to the rejection section for further discussions. Therefore, claim 1 is not in condition for allowance and is still not patentably distinguishable over the prior art references. Similarly the other claims that depend from independent claim 1 are also still not in condition for allowance.

The Applicant alleges, "For example, Claim 5 requires that the pre-determined temporal context ..." in pages 6-7, and states respectively that the prior art reference Simpson does not suggest a temporal context model that is dependent on elapsed time between consecutive image in the sequence because the mere evaluation of two consecutive images in a sequence does not show a consideration of elapsed time between the two consecutive images as recited in claim 5. However the Examiner

disagrees because Simpson does state that the temporal context model / Recurrent Neural Network (RNNCCS) does depend on the elapsed time between the two consecutive images (see Simpson, page 2139, section 2 – Image Sequence Classification Using Recurrent Neural Networks, first paragraph, the Recurrent Neural Network uses the twelve daylight scenes per day evenly hourly (hourly or faster) spaced sequence of images in a time series manner for further improvement in classification, the Neural Network clearly is using that specific twelve scenes which are produced hourly per daytime elapse in time, it is not using the last scene from the current daytime and then the next first scene in the next daytime). Therefore, claim 5 is not in condition for allowance and is still not patentably distinguishable over the prior art.

The Applicant alleges, "For another example, newly added Claim 12 ..." in page 7, and states respectively that the prior art reference Simpson does not suggest that the revised image classification produces different results due to different elapsed times between a particular pair of consecutive images as recited in claim 12 respectively. The Examiner agrees that the Simpson reference does not specifically suggest that the revised image classification is dependent upon the initial image classification. However, Simpson in view of Loui does teach the amended limitation as recited in claim 12; refer below to the rejection section for further discussions. Therefore, claim 12 is not in condition for allowance and is still not patentably distinguishable over the prior art references.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1-2, 4-5 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Simpson ("A recurrent neural network classifier for improved retrievals of areal extent of snow cover" - IEEE - vol 39, Oct 2001, pages 2135-2147, as applied in previous Office Action) in view of Loui ("Automatic image event segmentation and quality screening for Albuming Applications" - IEEE - July 2000, cited by the Applicant in the Information Disclosure Sheet IDS filed on 11/13/2003).

Re Claim 1: Simpson discloses a method / single image classification using feed-forward neural networks (FFNN) and image sequence classification using recurrent neural networks (RNNCCS) (see pages 2138-2139, section B. Present Approaches, abstract, lines 8-10) for improving scene classification of a sequence of digital images / sequence of twelve daylight scenes per day (see page 2139, section 2, paragraph 1) comprising the steps of (a) providing a sequence of images / sequence of twelve daylight scenes per day captured in temporal succession / temporal sampling into time series (see page 2139, section 2 - Image Sequence Classification Using Recurrent Neural Networks, first paragraph); (b) classifying each of the images individually / Single Image Classification using Feed-Forward Neural Networks (FFNN) based on information / spectral and textural contained in the individual image / single image using

no feedback to generate an initial image classification / single image classification for each of the images / sequence of twelve daylight scenes per day (Feed Forward Neural Network (FFNN) or in other words the single FFNN or in other words the three layer Feed Forward Neural Network (NNCCS): each image is individually classified [no feedback], see page 2139, Fig. 3a, abstract, lines 8-10); and (c) generating the respective initial image classification / FFNN and a predetermined temporal context model / Recurrent Neural Network (RNNCCS) that considers at least the temporal succession / temporal sampling into time series of the sequence of images / sequence of twelve daylight scenes per day (Recurrent Neural Network (RNNCCS): time series dependent sequence classification [feedback], see page 2139, Fig. 3b, section 2, paragraph 1, "time series" shows that the temporal succession of the sequence is considered when inputting data into the Recurrent Neural Network, abstract, lines 8-10, page 2139, section 2, paragraph 2 "THE RNNCCS network ...", lines 6-8, "more accurate than a single FFNN" shows a more accurate classification occurs and also that a comparison of the classification of the twelve daylight scene images sequence between the two networks [Single FFNN and Recurrent Neural Network] is considered and that these networks indeed do classify each image in this twelve scene per day sequence); and (d) storing the image classifications / FFNN and RNNCCS in a computer readable storage medium / RAM (see Simpson, page 2145, section – D. Performance Issues, the Neural Network classifications are processed in a computer environment and therefore are stored in the RAM or magnetic disk memory).

However, Simpson fails to specifically suggest that at least two pairs of consecutive images in the sequence of images have different elapsed times between their capture, generating a revised image classification for each image based at least on the respective initial image classification and a predetermined temporal context model, and storing the revised image classification.

Loui discloses at least two pairs of consecutive images / adjacent pictures in the sequence of images / sequence of chronologically ordered photos having different elapsed times / uneven time interval or time difference between their capture (see Loui, Fig. 2, section – II. Image Event Segmentation, paragraph 1, lines 12-16, the time interval or the time difference between adjacent pictures are uneven as seen in the Figure 2 where some adjacent pictures are very close in relative elapsed time whereas some adjacent pictures are far spread in relative elapsed time); generating a revised image classification / refinement (see Loui, Fig. 1) for each image based at least on the respective initial image classification / classification using image content and a predetermined temporal context model / classification using contextual image time data (see Loui, section – I. Introduction, paragraph 1, lines 12-17 and 20-24, Fig. 1, Loui event classifies images using content image data [this is similar to Simpsons initial FFNN single classification using spectral and textural image content] and event classifies images using contextual time data [this is similar to Simpsons RNNCCS Recurrent Neural Network classification using the time series image sequence] and creates a revised / refinement event classification using both event classifications); and storing the revised / refinement image classification (see Loui, Figs. 4 and 5, image

signal processing is accomplished by computer systems and the output of Loui's event classification is seen in the computer type output in figures 4 and 5 [this is similar to Simpsons image signal processing classifications being stored in the RAM or magnetic disk memory of the computer system]).

Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to modify Simpson's method using Loui's teachings by including to Simpsons hourly or faster temporal sampling the ability to have consecutive images with different elapsed times in order to better relate adjacent pictures with clustering (see Loui, Fig. 2, Section – II. Image Event Segmentation, paragraph 1, lines 1-4) and by including the generation of the revised / refined image classification after Simpsons FFNN [initial image classification] and RNNCCS [Recurrent Neural Network] classifications in order to combine the content image data and contextual image time data into the refined event classification (see Loui, Fig. 1, Section – I. Introduction, paragraph 1, lines 20-24).

Re Claim 2: Simpson further discloses the information used in step (b) includes pixel information / spectral and textural (see page 2138, section 1 - Single Image Classification Using Feed-Forward Neural Networks, first paragraph).

Re Claim 4: Loui further discloses the pre-determined temporal context model in step (c) is independent of elapsed time between consecutive images (see Loui, Section – II.

Image Event Segmentation, paragraph 1, lines 8-10, there could be an instance when no time interval data is available).

Re Claim 5: Simpson further discloses the pre-determined temporal context model in step (c) is dependent on elapsed time / temporal sampling into time series between consecutive images (see Simpson, page 2139, section 2 – Image Sequence Classification Using Recurrent Neural Networks, first paragraph, the Recurrent Neural Network uses the twelve daylight scenes per day evenly hourly (hourly or faster) spaced sequence of images in a time series manner for further improvement in classification, the Neural Network clearly is using that specific twelve scenes which are produced hourly per daytime elapse in time, it is not using the last scene from the current daytime and then the next first scene in the next daytime).

Re Claim 12: Loui further discloses wherein the predetermined temporal context model in step (c) is dependent on elapsed time between consecutive images in the sequence, such that different elapsed times between a particular pair of consecutive images produces a different revised image classification for a later-captured image of the particular pair of consecutive images (see Loui, Fig. 2, section – II. Image Event Segmentation, paragraph 1, lines 12-16, the time interval or the time difference between adjacent pictures are uneven as seen in the Figure 2 where some adjacent pictures are very close in relative elapsed time whereas some adjacent pictures are far spread in relative elapsed time, the contextual image time data is used along with the content

image data for the refined classification, Figs. 4 and 5 show that different elapsed times between particular pair of consecutive images produce different event classification results, if a pair of images are real close in elapsed time they will most likely [also dependent upon image content data] be classified in the same event, if a pair of images are far in elapsed time they will most likely [also dependent upon image content data] be classified in different events).

9. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Simpson as modified by Loui, and in further view of Tretter et al (US 6,977,679 B2, as applied in previous Office Action). The teachings of Simpson as modified by Loui have been discussed above.

However, Simpson as modified by Loui fails to specifically suggest the information used in step (b) includes capture-device generated metadata information.

Tretter, as recited in claim 3, discloses the information used in step (b) includes capture device generated / digital camera metadata / focusing distance information (see abstract, lines 6-13).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Simpson's method, as modified by Loui, using Tretter's teachings by including focusing distance metadata to Simpson's step (b) in order to enhance the classification of snow cover by further distinguishing clouds and snow cover by identifying the difference in distance between clouds and the snow cover from the satellite which captures images.

10. Claims 6, 8, and 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Simpson as modified by Loui, and further in view of Huang ("Integration of multimodal features for video scene classification based on HMM" - IEEE - Sept 1999, pages 53-58, as applied in previous Office Action). The teachings of Simpson as modified by Loui have been discussed above.

However, Simpson as modified by Loui fails to specifically suggest that the temporal context model is a non-casual model dependent on both a previous image and a subsequent image.

Huang, as recited in claim 8, discloses the pre-determined temporal context model is a non-casual model / discrete ergodic Hidden Markov Model dependent on both the previous image and a subsequent image / visited from any state (see page 55, section Product HMM, page 56, section SIMULATION RESULTS, second paragraph, the discrete ergodic HMM visits any states or images from any state or image which makes the model non-causal).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Simpson's method, as modified by Loui, using Huang's teachings by replacing a non-causal discrete ergodic Hidden Markov Model with Simpson's temporal context model in order to give more correlation data between all the images of the sequence instead of just a few images (images before the current image) to further improve the accuracy of the classification.

Although Simpson's temporal context model, as modified by Loui, and in further view of Huang's modifications teaches a non-causal discrete ergodic Hidden Markov Model, it does not specifically disclose, as recited in claim 6, that the temporal context model is the causal Hidden Markov Model dependent on a previous image, and it does not specifically disclose, as recited in claim 10, that the temporal context model is imposed using Viterbi algorithm, and it does not specifically disclose, as recited in claim 11, that the temporal context model is imposed using a belief propagation algorithm. It would have been obvious to one of ordinary skill in the art at the time the invention was made though to have such a feature of causality in a HMM model, a Viterbi algorithm, or a belief propagation algorithm for a temporal context model because they are just other methods of computing the probability for classification of a particular sequence which Huang's non-causal Hidden Markov Model is basically accomplishing.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bernard Krasnic whose telephone number is (571) 270-1357. The examiner can normally be reached on Mon-Thur 8:00am-4:00pm and every other Friday 8:00am-3:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on (571) 272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Bernard Krasnic
December 11, 2007

JINGGE WU
SUPERVISORY PATENT EXAMINER